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EXAMINER	
NGUYEN, SANG H	
ART UNIT	**PAPER NUMBER**
2877	

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/016,913	KURATA ET AL.	
	Examiner	Art Unit	
	Sang Nguyen	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *26-29* is/are allowed.

6)☒ Claim(s) *1,2,4,8-11,13-23 and 25* is/are rejected.

7)☒ Claim(s) *3,5-7,12 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

Applicant's arguments, see remarks filed on 09/29/05 and 10/03/05, with respect to the rejection(s) of claim(s) 1-2, 4, 8-11, 13-18, 20-23, and 25 under Choi (U.S. Patent No. 6,538,754) in view of Reytblatt (U.S. Patent No. 4,286,843); and Choi (U.S. Patent No. 6,538,754) in view of Ishiwata (U.S. Patent No. 6,369,375) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of S. T. Tang et al (Measurement of Reflective LCD Cell Gap) in view of Reytblatt (U.S. Patent No. 4,286,843) and Ishiwata (U.S. Patent No. 6,369,375).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2 and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over S. T. Tang et al (Measurement of Reflective LCD Cell Gap submitted by Applicant in IDS on 04/01/05) in view of Reytblatt (U.S. Patent No. 4,286,843).

Regarding claims 1 and 14; S. T. Tang et al teaches an apparatus and method for measuring of reflective LCD cell gap, comprising:

- A light emission apparatus, considered to be a light source (L of figure 1), input polarizer (P of figure 1), and a beam splitter (BS of figure 1), for causing a polarized light to fall almost parallel to the normal of the liquid crystal panel (S of figure 1), and a rotary stage (R of figure 1) for rotating the direction of polarization of the incident light (LP1, LP2 of figure 2) to respect to the liquid-crystal panel (S of figure 1);
- An analyzer (A of figure 1) for receiving the reflected light from the liquid crystal panel (S of figure 1), wherein the analyzer (A of figure 1) being arranged so that the transmission axis thereof is almost perpendicular to the polarization direction of the incident light of the polarizer (P of figure 1); and
- A received light quantity detection device considered to be a detector (D of figure 1) for receiving the light the passed the analyzer (A of figure 1) and detecting the gap of the liquid crystal panel (S of figure 1) based on the twist angle (Φ of figure 3) of the liquid crystal panel (S of figure 1). See figures 1-6.

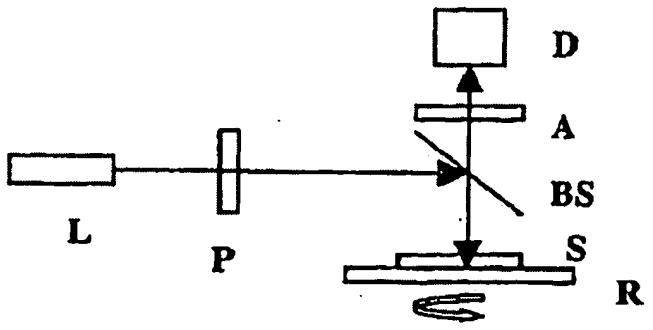

FIG. 1 The basic set-up for reflective LCDs measurement. L-light source, P-polarizer, BS-beam splitter, S-sample, R-rotary stage, A-analyzer, D-detector.

S.T Tang et al discloses all of features of claimed invention except for the processing apparatus for detecting the gap of the liquid crystal panel based on an extinction angle at which the output signal of the received light quantity detection device reaches minimum when the direction of incidence of incident light is rotated relative the transmission axis direction of the analyzer. However, Reytblatt teaches that it is known in the art to provide a method and a plane-transmission polariscope (30 of figure 1 or 110 of figure 16) comprising a light source (32 of figure 16), polarizer (34 of figure 16), a sample (120 of figure 16), analyzer (44 of figure 16), and a camera (52 of figure 16), wherein a plane-transmission (30 of figure 1 or 110 of figure 16) for detecting the gap of the sample based on an extinction angle at which the output signal of the received light quantity detection device considered to the camera (52 of figure 16) reaches minimum or zero when the direction of incidence of incident light is rotated relative the transmission axis direction of the analyzer (44 of figure 16 and col.6 lines 29-66 and col.10 lines 35-59).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify apparatus and method for detecting a gap of a liquid crystal panel of S. T. Tang et al with the processing apparatus for detecting the gap of the liquid crystal panel based on an extinction angle at which the output signal of the received light quantity detection device reaches minimum when the direction of incidence of incident light is rotated relative the transmission axis direction of the analyzer as taught by Reytblatt for the purpose of detecting accuracy intensity light

wavelength forming an image of given point of specimen by changing the orientations of the polarizer/analyzer (col.1 lines 30-40 and col.6 lines 30-35).

Regarding claim 2; S. T. Tang et al teaches about the direction of the polarization of the incident light of the polarizer (P of figure 1) on the liquid crystal panel (S of figure 1) and the sample panel (S of figure 1) are rotated relative to each other (figures 1-2) by rotating the liquid crystal panel (S of figure 1) with the rotary stage (R of figure 1) about the axis almost parallel to the direction of incident of the incident light as a center (Page 110 and figures 1-2).

Regarding claim 15; S. T. Tang et al teaches the detector (D of figure 1) of the processing apparatus detects the gap of the liquid-crystal panel (S of figure 1) based on the extinction angle (considered to be twist angle see figure3) when the liquid-crystal panel (S of figure 1) is rotated by the rotary stage (R of figure 1) about the axis almost parallel to the direction of incident light (figure 2).

Regarding claim 16; S. T. Tang et al teaches the light emission apparatus (L of figure 1) having a polarizer (P of figure 1).

Regarding claim 17; S. T. Tang et al teaches discloses all of features of claimed invention except for the received light quality detection use a surface-type imaging element. However, Reytblatt teaches that it is known in the art to provide the received light quality detection use a surface-type imaging element considered to be image camera (52 of figure 16). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify apparatus and method for detecting a gap of a liquid crystal panel of S. T. Tang et al with the received light quality detection

use a surface-type imaging element as taught by Reytblatt for the purpose of forming or detecting accuracy images of sample on the camera.

Regarding claim 18; S. T. Tang et al teaches about the light emission apparatus (L of figure 1) and the received light quantity detection device (D of figure 1) has a wavelength selection function considered to be a wavelength solution in figures 4-6 (pages 110-111).

Claims 4, 8-11, 13, 19-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over S. T. Tang et al (Measurement of Reflective LCD Cell Gap submitted by Applicant in IDS on 04/01/05) in view of Ishiwata (U.S. Patent No. 6,369,375).

Regarding claims 4 and 19; S. T. Tang et al teaches an apparatus and method for detecting a gap of a liquid crystal panel, comprising:

- A light emission apparatus, considered to be a light source (L of figure 1), input polarizer (P of figure 1), and a beam splitter (BS of figure 1), for causing a polarized light to fall almost parallel to the normal of the liquid crystal panel (S of figure 1), and a rotary stage (R of figure 1) for rotating the direction of polarization of the incident light (LP1, LP2 of figure 2) to respect to the liquid-crystal panel (S of figure 1);
- An analyzer (A of figure 1) for receiving the reflected light from the liquid crystal panel (S of figure 1), wherein the analyzer (A of figure 1) being arranged so that the transmission axis thereof is almost perpendicular to the polarization direction of the incident light of the polarizer (P of figure 1); and
- A received light quantity detection device considered to be a detector (D of figure

1) for receiving the light the passed the analyzer (A of figure 1) and detecting the gap of the liquid crystal panel (S of figure 1). See figures 1-6.

S. T. Tang et al discloses all of features of claimed invention except for a process apparatus is coupled to a first received light detection device and a second received light detection device, wherein the process apparatus for detecting the gap of the liquid crystal panel based on the first output signal from the first received light detection device in a state in which the analyzer is disposed so that the transmission axis of the analyzer is almost parallel to the polarization direction of the incident light and a second output signal from the second received light detection device in a state which the analyzer is disposed so that the transmission axis of the analyzer is almost perpendicular to the polarization direction of the incident light . However, Ishiwata teaches that it is known in the art to provide a method and detection apparatus comprises a processing computer (6 of figure 13) coupled to a first and second camera (5' of figure 13), wherein the process apparatus (6 of figure 13) for detecting the gap of the liquid crystal panel (15 of figure 13) based on the first output signal from the first received light detection device (5' of figure 13) in a state in which the analyzer (16 of figure 1) is disposed so that the transmission axis of the analyzer is almost parallel to the polarization direction of the incident light (figure 13) and a second output signal from the second received light detection device (5' of figure 1) in a state which the analyzer (16 of figure 1) is disposed so that the transmission axis of the analyzer (16 of figure 1) is almost perpendicular to the polarization direction of the incident light. See figures 1, 7, and 13-14.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify apparatus and method for detecting a gap of a liquid crystal panel of S. T. Tang et al with a process apparatus is coupled to a first received light detection device and a second received light detection device, wherein the process apparatus for detecting the gap of the liquid crystal panel based on the first output signal from the first received light detection device in a state in which the analyzer is disposed so that the transmission axis of the analyzer is almost parallel to the polarization direction of the incident light and a second output signal from the second received light detection device in a state which the analyzer is disposed so that the transmission axis of the analyzer is almost perpendicular to the polarization direction of the incident light as taught by Ishiwata for the purpose of detecting accuracy of physical amounts such distortion, edge of the step, and phase distribution of the observation object sample(col.21 lines 34-36).

Regarding claim 20; S. T. Tang et al teaches the light emission apparatus (L of figure 1) having a polarizer (P of figure 1).

Regarding claims 8 and 23; S. T. Tang et al discloses all of features of claimed invention in figure 2 that the first output and the second output signals (LP1, LP2 of figure 2) of the received light detection device (D of figure 1) for detecting at least two different rotation positions (figure 2 indicate detects different direction of the position LP1 and LP2 on the sample) obtained by rotating about an axis almost parallel to the direction of the incidence of the incident light on the liquid-crystal panel (S of figure 1) as

a center (figure 1) and gap of the liquid-crystal panel is detected by on the output signals detected in each rotation position (page109).

Regarding claim 9; S. T. Tang et al discloses the features of claimed invention except for the angle differs by no less than 5 degrees. However, S. T. Tang et al teaches the angle differs between the twist angle (Φ of figure 3) and polarizer angle (α of figure 4). See figures 3-4 and page 110. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the angle differ from no less than 5 degrees of S. T. Tang et al's device, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claims 10 and 11; S. T. Tang et al discloses the features of claimed invention except for a half-mirror for directing reflecting the light from the light source toward the liquid crystal panel and transmitting reflected light from the liquid crystal panel and the first and second received light detection devices for detecting the gap cell based on the first and second output signals with predetermined noise light quality, quantity incident light, and transmissivity of the half mirror. However, Ishiwata teaches that it is known in the art to provide a half-mirror (12 of figure 13) for directing reflecting the light from the light source (1 of figure 13) toward the liquid crystal panel (15 of figure 13) and transmitting reflected light from the liquid crystal panel (15 of figure 14) and the first and second received light detection devices (two 25' of figure 14) for detecting the gap cell based on the first and second output signals with predetermined noise light quality, quantity incident light, and transmissivity of the half mirror (col.21 lines 15-36). It

would have been obvious to one having ordinary skill in the art at the time the invention was made to modify apparatus and method for detecting a gap of a liquid crystal panel of S. T. Tang et al with a half-mirror for directing reflecting the light from the light source toward the liquid crystal panel and transmitting reflected light from the liquid crystal panel and the first and second received light detection devices for detecting the gap cell based on the first and second output signals with predetermined noise light quality, quantity incident light, and transmissivity of the half mirror as taught by Ishiwata for the purpose of improving detected light signal and reducing noise signal.

Regarding claim 21; S. T. Tang et al teaches discloses all of features of claimed invention except for the received light quality detection use a surface-type imaging element. However, Ishiwata teaches that it is known in the art to provide the received light quality detection use a surface-type imaging element considered to be image camera (5' of figure 13). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify apparatus and method for detecting a gap of a liquid crystal panel of S. T. Tang et al with the received light quality detection use a surface-type imaging element as taught by Ishiwata for the purpose of forming or detecting accuracy images of sample on the camera.

Regarding claim 22; S. T. Tang et al teaches about the light emission apparatus (L of figure 1) and the received light quantity detection device (D of figure 1) has a wavelength selection function considered to be a wavelength solution in figures 4-6 (pages 110-111).

Regarding claims 13 and 25; S. T. Tang et al discloses all of features of claimed invention as indicated in claims 4 and 19, except for a polarization beam splitter disposed so as to receive the reflected light from the liquid crystal panel and separating a light having a polarization direction almost parallel to the polarization direction of the incident light and a light having a polarization direction almost perpendicular to the polarization direction of the incident light from the reflected light. However, Ishiwata teaches that it is known in the art to provide a method and detection apparatus comprises a processing computer (6 of figure 13) coupled to a first and second camera (5' of figure 13) and the first and second camera (5' of figure 13) coupled to a polarization beam splitter (PBS of figure 13), wherein the polarization beam splitter (PBS of figure 13) disposed so as to receive the reflected light from the liquid crystal panel (15 of figure 13) and separating a light having a polarization direction almost parallel to the polarization direction of the incident light and an another light having a polarization direction almost perpendicular to the polarization direction of the incident light from the reflected light. See figures 1, 7, and 13-14. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify apparatus and method for detecting a gap of a liquid crystal panel of S. T. Tang et al with a polarization beam splitter disposed so as to receive the reflected light from the liquid crystal panel and separating a light having a polarization direction almost parallel to the polarization direction of the incident light and a light having a polarization direction almost perpendicular to the polarization direction of the incident light from the reflected light as taught by Ishiwata for the purpose of detecting accuracy of physical

amounts such distortion, edge of the step, and phase distribution of the observation object.

Allowable Subject Matter

Claims 26-29 are allowed.

The prior art of record, taken alone or in combination, fails discloses or render obvious apparatus for detecting a gap of a liquid crystal panel comprising all the specific elements with the specific combination including of *third output signal from the received light quantity detection device in a state at which the analyzer is disposed so that the transmission axis of the analyzer is located on a bisector of the direction almost parallel to polarization direction of the incident light and the direction almost perpendicular thereto* in combination with the rest of the limitation of claim 26.

Claims 3, 5-7, 12, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and apparatus for detecting a gap of a liquid crystal panel comprising all the specific elements with the specific combination including of *the gap d of the liquid crystal panel is detected by the following equations by using the detected extinction angle : tan(2ϕ app) = tan 2 (ϕ app + π/2) = ϕ[(tanX)/X], where X = sqr (ϕ^2 + β^2), β = ($\pi\Delta$nd)/λ; Δn = [(ne*no)/sqr((no^2 +(ne^2-no^2).sinθ)] –no* in set forth limitation of claim 3.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and apparatus for detecting a gap of a liquid crystal panel comprising all the specific elements with the specific combination including of *the gap d of the liquid crystal panel is detected by the following equations by using the detected the first output signal Rx and the second output signal Ry: Rx = cos^2eff + cos^2(app+in) sin^2eff; Ry = sin^2(app +in)sin^2 eff; cosβeff = cos^2X + (ϕ^2 - β^2). [sin^2X/X^2)]; cos2ϕapp.sinβeff = 2β[(sinX.cosX)/X]; sin2ϕapp.sinβeff = 2ϕβ(sin^2(X))/X^2; βeff = (2πΔeff.d)/λ; tan(2ϕ app) = tan 2 (ϕ app + π/2) = ϕ[(tanX)/X], where X = sqr (ϕ^2 + β^2), β = (πΔnd)/λ; Δn = [(ne*no)/sqr((no^2 +(ne^2-no^2).sinθ)] –no* in set forth limitation of claim 5.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and apparatus for detecting a gap of a liquid crystal panel comprising all the specific elements with the specific combination including of *third received light quantity detection device for detecting a third output signal in a state in which the transmission axis of the analyzer is located on a bisector of the direction almost parallel to the polarization direction of the incident light and the direction almost perpendicular thereto, and in the step of detecting the gap of liquid crystal panel, the gap of the liquid crystal panel is detected based on the first, second, and third output signals* in set forth limitation of claim 6.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and apparatus for detecting a gap of a liquid crystal panel comprising all the specific elements with the specific combination including of *the gap d of the liquid*

*crystal panel is detected by the following equations by using the detected the first output signal Rx and the second output signal Ry, and the third output signal Rxy: Rxy = ½ [1 + sin^2(βeef). Sin4(φapp + αin)]; Rx = cos^2eff + cos^2(app+in) sin^2eff; Ry = sin^2(app +in)sin^2 eff; cosβeff = cos^2X + (φ^2 - β^2). [sin^2X/X^2)]; cos2φapp.sinβeff = 2β[(sinX.cosX)/X]; sin2φapp.sinβeff = 2φβ(sin^2(X))/X^2; βeff = (2πΔeff.d)/λ; tan(2φ app) = tan 2 (φ app + π/2) = φ[(tanX)/X], where X = sqr (φ^2 + β^2), β = (πΔnd)/λ; Δn = [(ne*no)/sqr((no^2 +(ne^2-no^2).sinθ)] –no* in set forth limitation of claim 7

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and apparatus for detecting a gap of a liquid crystal panel comprising all the specific elements with the specific combination including of *the step of measuring a fourth signal representing the noise light quality and measuring a fifth output signal representing the noise light quality* in set forth limitation of claims 12 and 24.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Abraham et al (6275291) discloses micropolarimeter and ellipsometer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sang Nguyen

Patent Examiner
Sang Nguyen 10/11/05
Art Unit 2877